Bullish FLOW TRADERS

Navigating the Convergence of Crypto and Traditional Financial Markets

Hong Kong | Amsterdam

7 September 2023

About us

Bullish

Launched in November 2021, Bullish is a leading regulated and audited institutional digital assets exchange with total trading volumes exceeding $250 billion (as of August 31, 2023). From day one, Bullish was built with the objective of being an institutional-grade platform, prioritizing compliance, audit and governance frameworks. We believe that the era of digital assets is only in its infancy, and we're building boldly with that future in mind.

The genesis of Bullish's DNA can be traced back to the anticipation of two pivotal factors within the digital assets space:

1. The growing importance of compliance and regulation; and
2. The imminent entry of institutional players

To address these two core theses, we first obtained a Distributed Ledger Technology (DLT) license under the Gibraltar Financial Services Commission (GFSC) in order to be a regulated exchange from day one. Recognizing that transparency and compliance are key pillars of trust, we further bolstered our commitment by engaging Deloitte & Touche, a Big Four accounting firm, who has been our auditor since 2020.

Second, we pioneered a cutting-edge technological innovation by integrating the high performance of a central limit order book (CLOB) with deep, deterministic liquidity from our automated market maker (AMM) technology. This combined source of liquidity creates a deeper and more reliable orderbook that operates independently from external price feeds and is tailored for institutions.

Our proprietary order book combines Automated Market Making instructions (AMM Instructions) and standard bids and offers. The unique combination of a traditional crypto exchange and a decentralized exchange allows for innovations such as:

- Deep, deterministic liquidity with predictable pricing and depth across market conditions
- Near-zero spreads and low transaction fees
- Customizable trading income generated from AMM Instructions, and
- High performance and transaction throughput.

Flow Traders

Flow Traders is a leading trading firm on a mission to transform financial markets by driving transparency and efficiency. Established in 2004, it has grown into one of the world's leading multi-asset liquidity providers and market makers, specializing in exchange-traded products (ETPs), fixed income, foreign exchange, cryptocurrencies, and commodities. In 2022, Flow Traders traded $6.8 trillion in total value across more than 180 venues and with 2,400 institutional counterparties.

Within crypto, Flow Traders has been an active and regulated participant since 2017, providing liquidity on over 200 ETPs and trading across products on all major centralized and decentralized exchanges.

In addition to market making, our dedicated venture capital unit (Flow Traders Strategic Capital) partners with ambitious entrepreneurs and teams to build technology businesses that lead to innovation within global financial markets. Our investment focus centres on infrastructure, data, and connectivity within decentralized finance (DeFi).

Despite the volatility and uncertainty that has been experienced within the crypto ecosystem over the last 18 months, our conviction in the long-term potential of crypto and the underlying innovation remains steadfast.

However, innovation does not occur in a vacuum, and we believe that liquidity plays a critical role in fostering its development. A trading environment that allows market participants to enter and exit positions quickly and cost-effectively is a prerequisite for facilitating experimentation and attracting long-term investors and financial capital. This capital and experimentation ultimately enable technologists and entrepreneurs to expand and accelerate the frontier of innovation which leads to new technological paradigms, business models, and widespread adoption.

We believe this convergence of capital, innovation, and technology is an exciting and monumental tipping point for global finance markets and an important element to its success is bridging traditional and digital asset markets. As a leading market maker in both, we are uniquely positioned to leverage our expertise and connectivity to build with ecosystem partners and bring the best from both domains.

If we succeed in driving this evolution, we can realize a world where crypto fulfils its potential as a more accessible, secure, and efficient global financial ecosystem.

Introduction

As the world of cryptocurrencies continue to mature, institutional investors are increasingly attracted to this burgeoning space. However, their entrance demands a well-structured market to navigate, one that mirrors the familiarity and rigor of traditional financial systems. This paper aims to delve into the evolving architecture of the cryptocurrency market and the growing convergence of this dynamic landscape with traditional finance (TradFi).

Following this, we will delve into Bitcoin's correlation with traditional assets, particularly equities and gold. This analysis provides some insight into the market's behaviour and its potential implications for institutional investors. Understanding these correlations is essential as Bitcoin's price action often serves as a barometer for broader crypto market sentiment. We analyse the fluctuations in correlations over the years, highlighting the unique characteristics of the emerging asset class and its idiosyncratic risks.

Moving beyond correlations, we discuss the state of product growth and tokenization, two key trends and topics providing a view into institutionalization and capital flows in the space. Additionally, we address the segregation of custody and clearing in crypto, and how these adapted best-practices from TradFi can help bring the next wave of adoption and unlock novel designs and solutions that incorporate crypto's technological paradigm.

Next, we shift focus to the market structure that institutional investors require to enter the crypto space. These include the development of sector classification schemas, akin to the Global Industry Classification Standard (GICS) used in TradFi. Currently, there is no universal framework for categorizing cryptocurrencies beyond the major protocols like Bitcoin and Ethereum. We discuss the importance of establishing a comprehensive classification system that enables investors to differentiate between various market segments, facilitating the development of indexes, new products, and allocation strategies. Each of these elements contributes to establishing the market structure sought by institutional investors. By addressing these topics, we aim to provide insights into the ongoing convergence between crypto and TradFi, highlighting the opportunities and challenges that lie ahead.

As the crypto space continues to evolve, it is essential for institutional investors to have a clear understanding of the market structure and its implications. By exploring product growth, tokenization, role segregation and sector classification schemas, we aim to shed light on the emerging landscape and provide insights for institutions looking to navigate this rapidly evolving space. Our objective is to provide a comprehensive and detailed examination of these topics, offering a roadmap for institutional investors looking to venture into the world of cryptocurrencies.
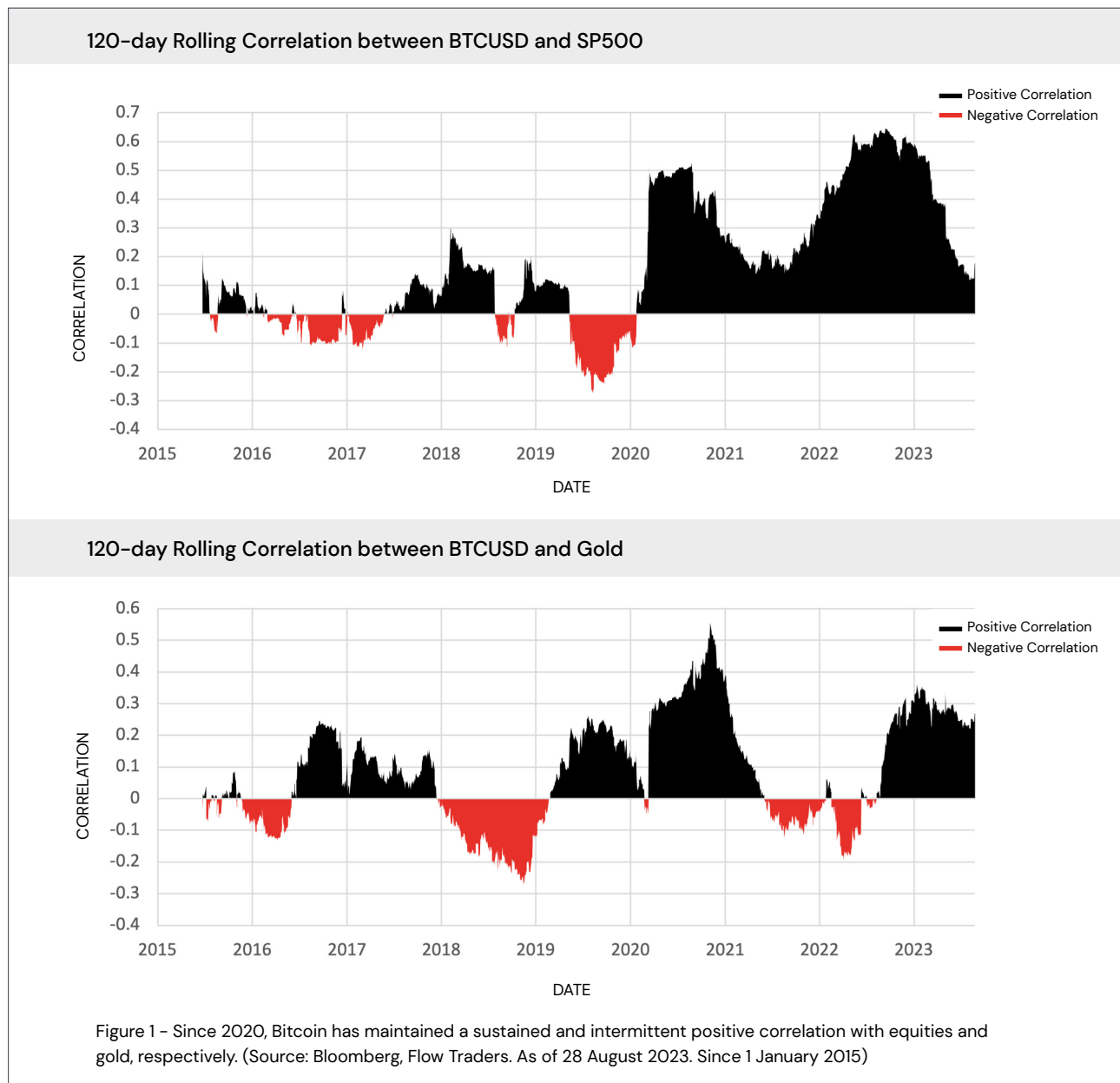
Correlations

Convergence comes in various forms, and we start by examining Bitcoin price action relative to traditional assets like equities and gold, and how these relationships have evolved over time.

For this, we will exclusively focus on the correlation of normalized daily returns between Bitcoin and the S&P 500 index and gold since 2015 (Figure1). Bitcoin, being the largest cryptocurrency by market capitalization, is widely considered a bellwether for broader crypto market adoption and sentiment.

During that time, Bitcoin and cryptocurrencies in general have gone from relative obscurity and scorn to fully penetrating mainstream consciousness. This has put topics like regulation and central bank digital currencies (CBDC) squarely on the agendas of policymakers and central bankers.

Figure 1 – Since 2020, Bitcoin has maintained a sustained and intermittent positive correlation with equities and gold, respectively. (Source: Bloomberg, Flow Traders. As of 28 August 2023. Since 1 January 2015)
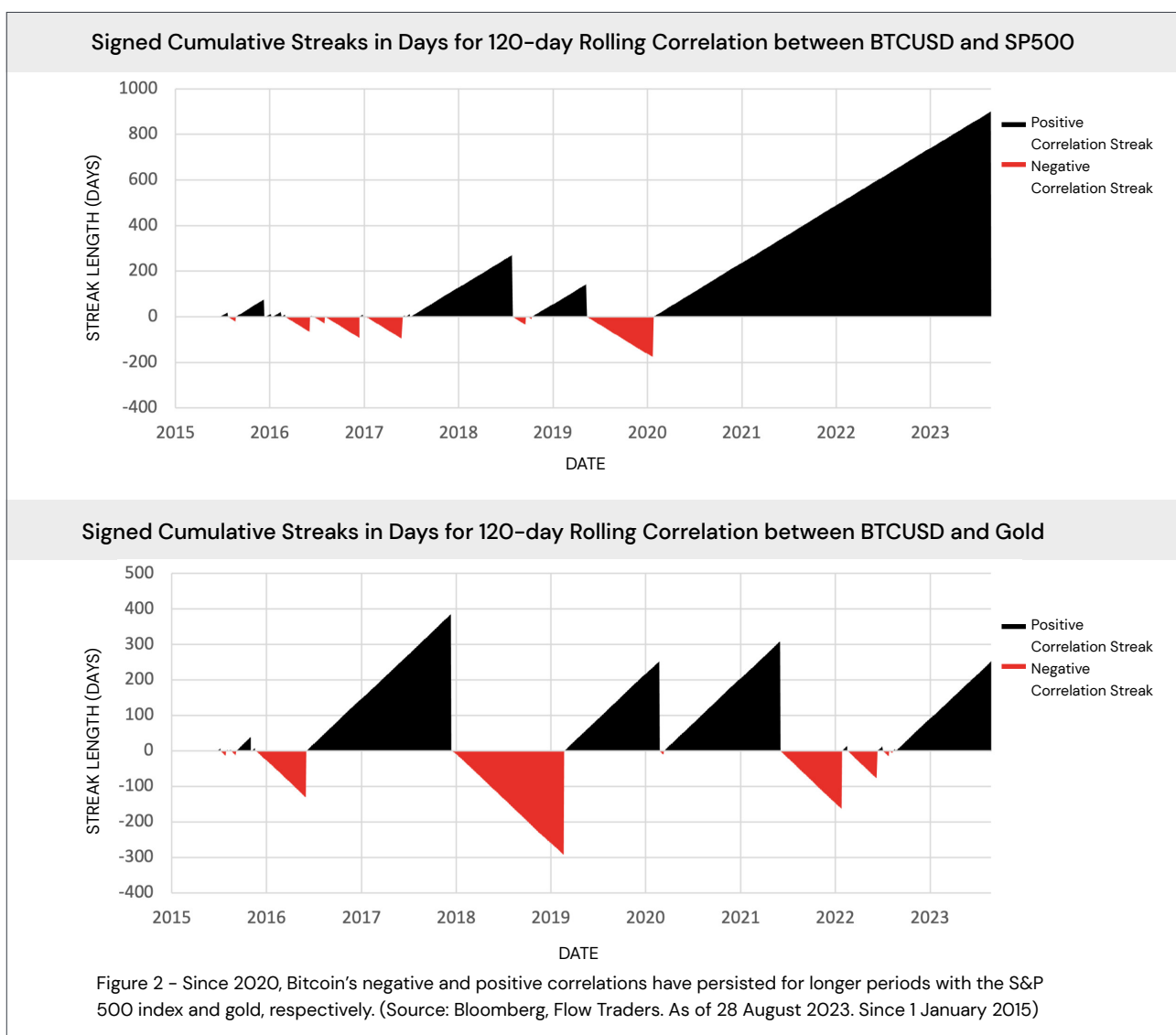
Here, we observe that correlations have fluctuated significantly between positive and negative values between the start of our observation period and the beginning of 2020. This is to be expected for an emerging asset class with relatively limited balance sheet penetration and idiosyncratic risks. From 2020 onwards, however, we notice that the magnitude of the correlations increase significantly.

Notably, in 2020, we observe a clear regime shift in the duration and persistence of correlations (Figure 2), whereby Bitcoin began a sustained period of positive correlation with equities and more frequent periods of positive correlation with gold as the inflation narrative took hold.

On the one hand, Bitcoin's unprecedented correlation to equities could be interpreted as clear sign of its polarity as a risk asset, whereas more sustained and frequent correlation with gold could also be interpreted as Bitcoin's arrival as an alternative asset class in inflationary and risk-off scenarios.

Taken together, however, we can assess the convergence between crypto and TradFi through the lens of price action and see that there has been a regime shift in how the nascent asset class is starting to trade more similarly against other traditional asset classes like equities and gold.

Figure 2 – Since 2020, Bitcoin's negative and positive correlations have persisted for longer periods with the S&P 500 index and gold, respectively. (Source: Bloomberg, Flow Traders. As of 28 August 2023. Since 1 January 2015)

While this report does not delve into the detailed analysis of the factors driving this regime shift, the visualizations presented here validate several intuitions and observations regarding the development of the space over the past four years. These include:

- The clear manifestation of institutionalization through the proliferation of crypto products in both the spot and derivatives market. This can be attributed to the entry of new TradFi players, increased institutional allocation, regulatory clarity, and even adoption by sovereign states.

- The recognition of Bitcoin as a legitimate macro asset class and a hedge against currency debasement. This is exemplified by its growing correlations with gold, indicating its establishment as a reliable store of value.

- The integration and convergence of the traditional banking and financial system with the crypto ecosystem. This trend is primarily driven by the emergence and popularity of dollar-pegged stablecoins such as Tether USDT and Circle USDC. These stablecoins are backed by commercial bank deposits, US Treasury bills, and other high-quality liquid assets, establishing a bridge between traditional and digital finance.

With the greater alignment in price action coinciding with the previously mentioned developments as our backdrop, we will now discuss some areas where we see crypto and traditional markets converging in the near- and medium-terms.
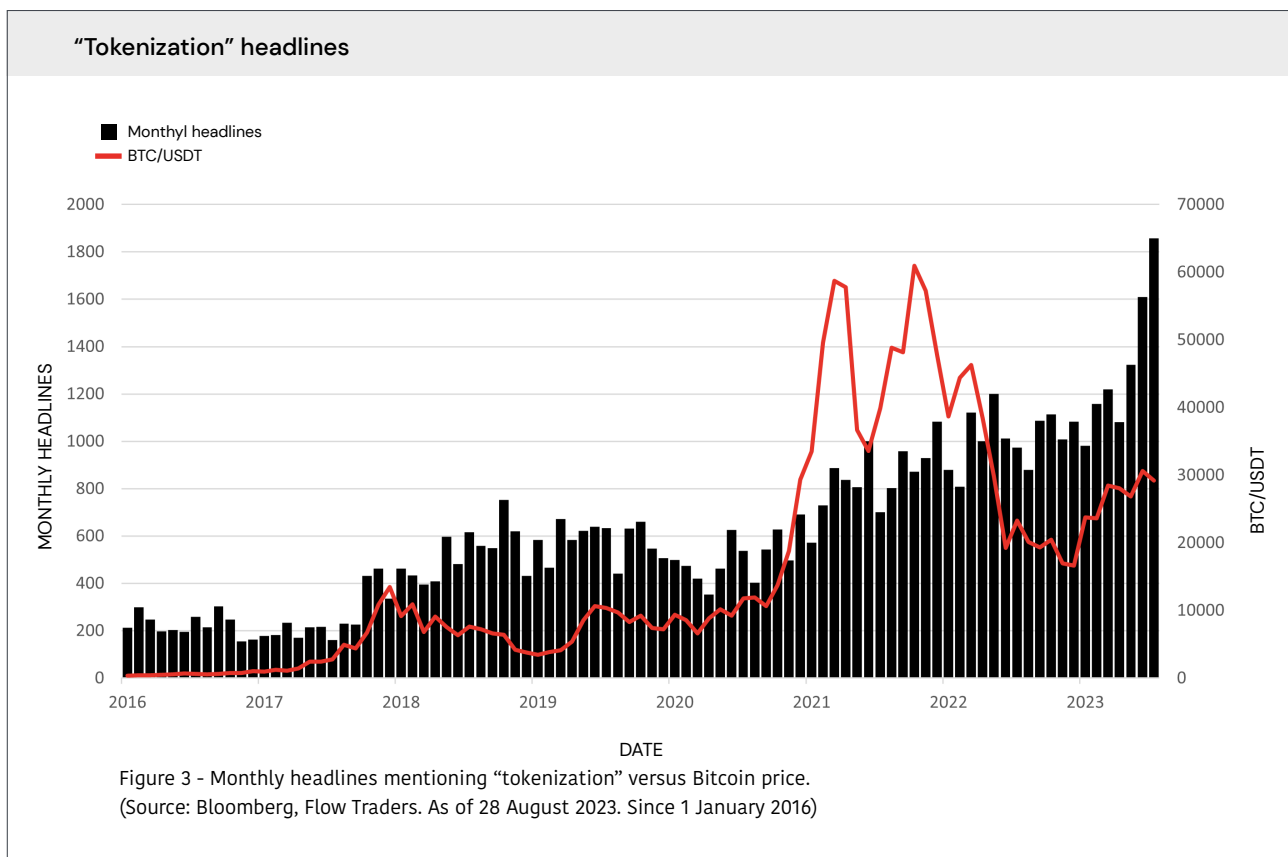
Tokenization

One of the best ways to figure out where we might be headed is to first have a clear view on what is occurring in the present. Currently, one of the most pressing topics at the intersection of crypto and TradFi is tokenization.

Tokenization refers to the process of representing "real-world" assets or units of value as digital tokens on a blockchain. These tokens can represent various types of assets or value, including securities, tangible assets like real estate, or intangible assets like intellectual property. For our purposes, we will focus on tokenized securities that have been issued on public blockchains.

Going back to 2014 when Tether, then Realcoin[1], was first launched on the Bitcoin network, stablecoins have become the most well-known and successful example of tokenization; proving product-market fit across various market cycles and macro environments.

One of the best ways to figure out where we might be headed is to first have a clear view on what is occurring in the present.

Figure 3 - Monthly headlines mentioning "tokenization" versus Bitcoin price.
(Source: Bloomberg, Flow Traders. As of 28 August 2023. Since 1 January 2016)

[1] CoinDesk, 2014. CoinDesk. [Online]
Available at: https://www.coindesk.com/markets/2014/11/20/realcoin-rebrands-as-tether-to-avoid-altcoin-association/
[Accessed 23 August 2023].

Figure 4 – On-chain stablecoin lending rates are now structurally below yields on US Treasury bills.
(Source: Bloomberg, Flow Traders. As of 28 August 2023. Since 1 July 2019)
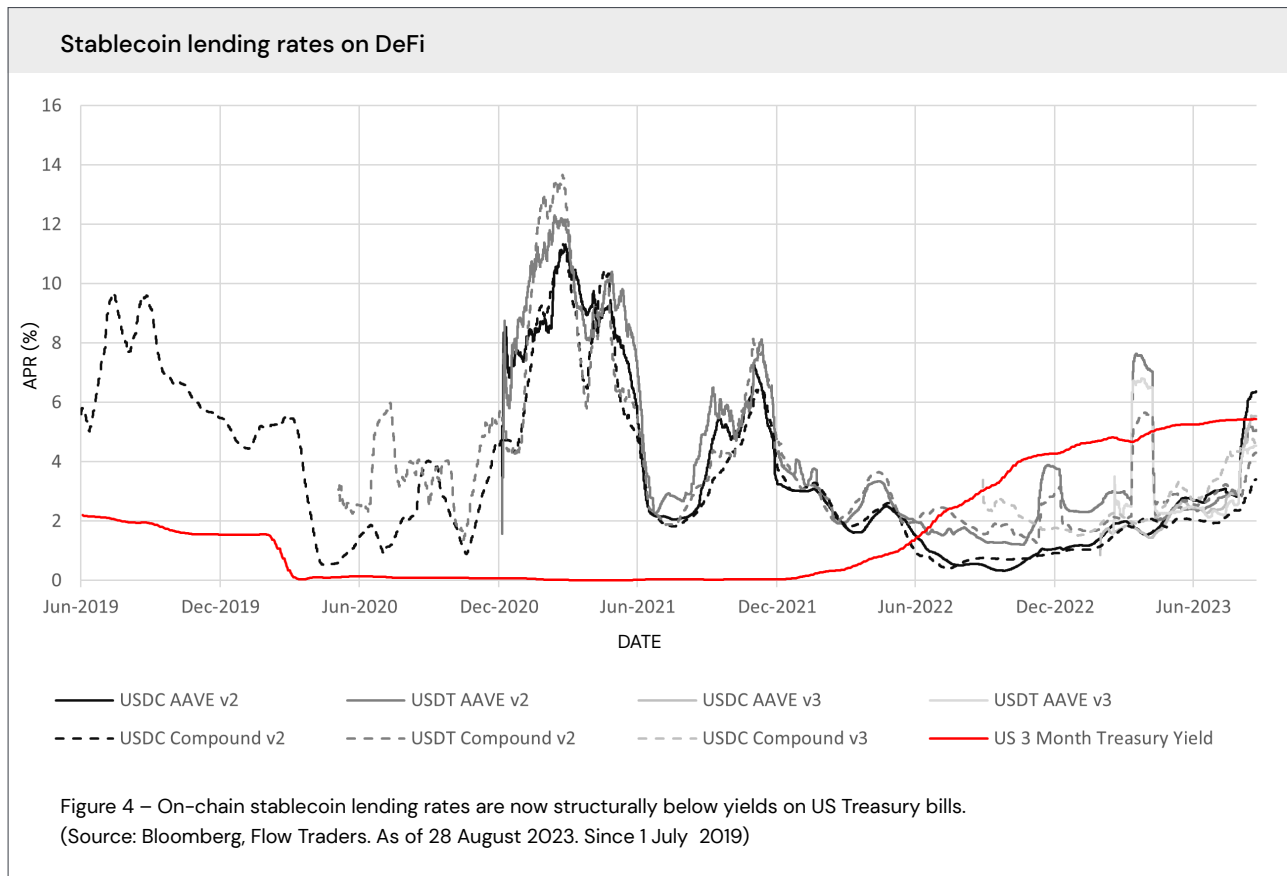
The topic itself has received extensive coverage over the years (Figure 3) and has re-emerged thanks to a combination of collapsing interest rate differentials between crypto and TradFi, narrative recycling during a bear market, and high-profile proponents such as Larry Fink, CEO of BlackRock.

Since the start of the bear market in 2022, the underlying structural bid and demand for leverage have dematerialized. As a result, on-chain interest rates on the largest lending and borrowing platforms have also collapsed (Figure 4), leaving on-chain participants on the side-line and in search of safety and yield.

One area that has seen substantial growth is the issuance of tokenized short-term US Treasuries, which have risen to over $620 million in outstanding issuances year-to-date (Figure 5). Nearly 50% of all tokenized US Treasury products are issued on the Stellar network by traditional issuers such as Franklin Templeton and Wisdomtree.

Total Value ⓘ	Avg. Yield to Maturity ⓘ
$624,074,556.16	5.25%

Treasury Product Market Caps by Protocol   [View Line Chart]

08/29/2023

● Arca Labs	$376,784
● Backed Finance	$47,116,664
● Franklin Templeton Benji Investments	$295,788,696
● Maple	$25,836,357
● Matrixdock	$69,604,577
● Ondo	$162,229,885
● Open Eden	$12,382,018
● Swarm	$16,214
● Wisdomtree Prime	$10,723,361

(Note: Historical support for some products is still under development)

Figure 5 – On-chain tokenized US Treasury products have grown to over $650 billion since the start of 2023 (Source: RWZ.xyz. Accessed on 29 August 2023. Since 1 January 2023)

EVM-based products, on the other hand, are led by issuers such as Ondo Finance, Matrixdock, Maple, Backed, and OpenEden. Together, these products account for the majority of issuances. However, nearly all products are restricted to non-US professional investors, and all potential buyers are subject to KYC and AML processes.

Among EVM-based US Treasury products, as of 29 August 2023, Ondo Finance and Matrixdock have achieved the most traction with $162 million and $69 million worth of tokens outstanding, respectively. Ondo Finance issues the Ondo Short-Term US Government Bond Fund (OUSD) ERC-20 token, which is backed by Blackrock's US Treasuries ETF (SHV). Matrixdock issues an actively managed and rebasing Short-Term US Treasury (STBT) ERC-1400 security token.

Despite being quite nascent, we view the rise of tokenized US Treasuries as a positive development and think of it as part of a larger trend of on-chain capital seeking and gaining exposure to off-chain assets. We believe this can and will have a potentially meaningful impact on how the space will develop in the short-to-medium term.

Looking back, this trend began in earnest in 2020 with MakerDAO's first foray into diversifying its reserves and treasury into so-called real-world assets (RWAs)[2]. RWAs are on-chain versions of assets that exist in the physical world or in TradFi, such as real estate, bonds, receivables, invoices, etc.

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[2] CoinDesk, 2020. CoinDesk. [Online]
vailable at: https://www.coindesk.com/business/2020/06/04 makerdao-weighs-accepting-real-world-assets-as-crypto-loan-collateral/
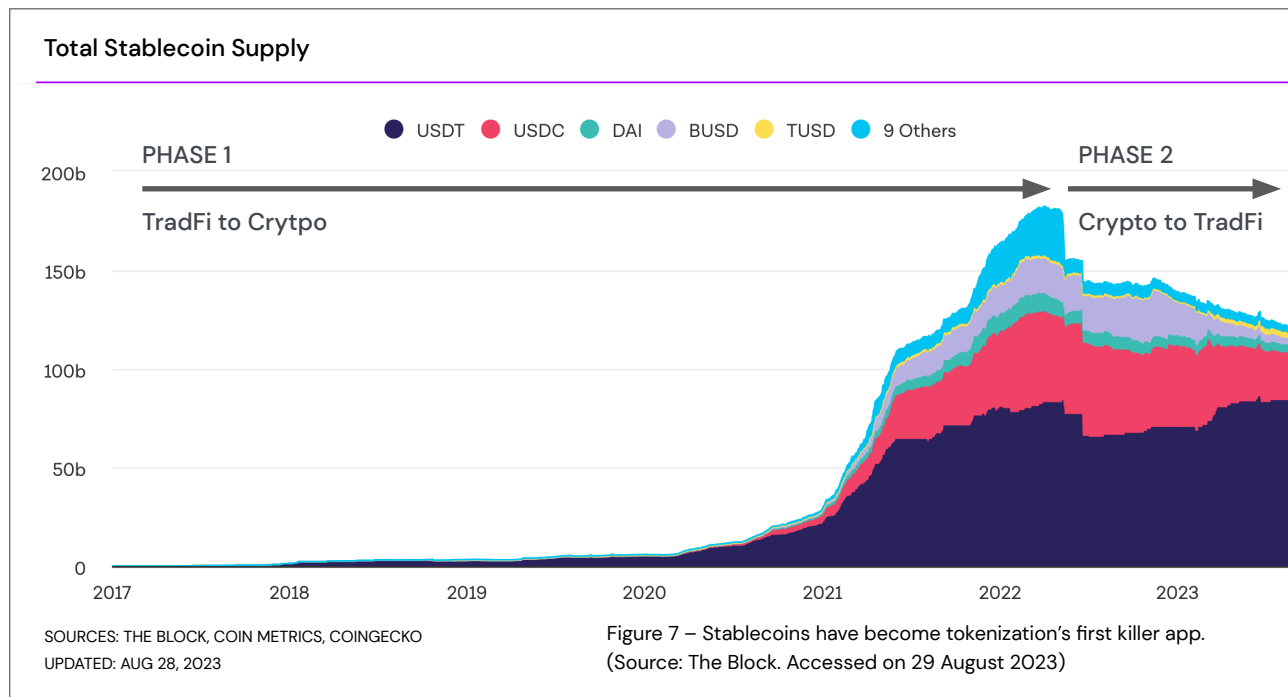Accessed 23 August 2023].

MakerDAO is a decentralized autonomous organization (DAO) that allows users to borrow its stablecoin, DAI, against various types of collateral, including RWAs. It is the organization behind one of the oldest stablecoin and lending protocols in DeFi.

In 2021, MakerDAO launched its first RWA vault backed by real estate loans from New Silver[3]. Since then, MakerDAO has expanded its RWA portfolio to include over $1.25 billion worth of US Treasury bonds, $500 million worth of USDC deposits on Coinbase Prime, and other loans from Centrifuge and 6s Capital (Figure 6).

Collateral list

COLLATERAL	TOTAL SUPPLY	CHANGE 24H	DEBT CEILING	LOCKED	ANNUAL FEES	
Monetalis Clydesdale RWA007-A	1,014,950,318 of 1.25B	—	1,250,000,000 usage 81%	$1.25B 123%	40,598,015 4%	›
BlockTower Andromeda RWA015-A	652,450,000 of 702M	—	1,280,000,000 usage 51%	$1.28B 196%	29,360,252 4.5%	›
Coinbase Custody RWA014-A	497,000,000 of 500M	—	500,000,000 usage 99%	$500M 101%	14,910,002 3%	›
H. V. Bank RWA009-A	100,000,000 of 100M Maxed	—	100,000,000 usage 100%	$100M 100%	109,420 0.11%	›
BlockTower S4 RWA013-A	69,658,301 of 70M Maxed	—	70,000,000 usage 100%	$85.2M 122%	2,786,332 4%	›
BlockTower S3 RWA012-A	51,482,846 of 80M	—	80,000,000 usage 64%	$97.3M 189%	2,059,314 4%	›
6s Capital RWA001-A	14,348,036 of 15M	—	15,000,000 usage 96%	$15.9M 111%	430,441 3%	›
Fortunafi RWA005-A	5,926,220 of 15M	—	15,000,000 usage 40%	$17.2M 290%	266,680 4.5%	›
New Silver RWA002-A	5,902,640 of 50M	—	50,000,000 usage 12%	$92.9M 1,574%	413,185 7%	›
ConsolFreight RWA003-A	1,810,035 of 2M	↓ 30.7k 1.67%	2,000,000 usage 91%	$2.36M 130%	108,602 6%	›
TOTAL	2,413,528,396 of 2.78B	↓ 30.7k 0%	3,362,000,000 usage 72%	$3.44B 143%	91,042,242	

Figure 6 – MakerDAO's portfolio of real-world assets. (Source: www.makerburn.com. Accessed on 29 August 2023)

[3] Yahoo, 2021. Yahoo Finance. [Online]
Available at: https://finance.yahoo.com/news/silver-completes-largest-loan-securitization-133500813.html
[Accessed 23 August 2023].

Figure 7 – Stablecoins have become tokenization's first killer app.
(Source: The Block. Accessed on 29 August 2023)

With this broader perspective of capital flows, and for the sake of simplicity, one can delineate the history of cryptocurrencies into two distinct phases (Figure 7).

The first phase spans from the inception of the Bitcoin network until March 2022 when the Fed raised interest rates. This period is characterized by capital flowing into crypto from TradFi. The second phase spans from March 2022 until present day and is characterized by capital flowing into TradFi from crypto.

Today, we can clearly see the market and infrastructural effects of the first phase evidenced by the rise and dominance of centralised exchanges and stablecoin issuers. What is less obvious about the current phase, though, are the organizational and infrastructural developments that are emerging from this reversal in capital flows.

The emergence of on-chain native organizations, such as MakerDAO, has led to their balance sheets extending into RWAs to de-risk their reserves and capitalize on higher TradFi rates.

One of the unintended consequences of this is the trailblazing of necessary legal and technical infrastructure, both on- and off-chain, which could be generalised and repurposed by other on-chain participants and for other use cases.

These new infrastructure and organizational practices could, therefore, enable greater capital efficiency and sophisticated risk management for crypto participants, including DAOs. Ultimately, it will create new pathways and products for capital to flow across crypto and TradFi, setting the stage for the next cycle of capital inflows into crypto.

Products

Institutional-focused product development in the crypto space has been ongoing for over five years, beginning with the first Bitcoin futures being listed on the CME exchange[4], after which many ETP products were issued globally that track cryptocurrencies (Figure 8).

Globally, over 200 ETPs have been listed in various forms. While most products track single cryptocurrencies, more recently ETPs have been created to track indexes, staked products, and even allow for short exposure. As of 25 August 2023, the AUM of these products totals $33 billion.

Figure 8 - Quarterly crypto ETP launches globally. (Source: Bloomberg, Flow Traders. As of 28 August 2023. Since 1 January 2017)

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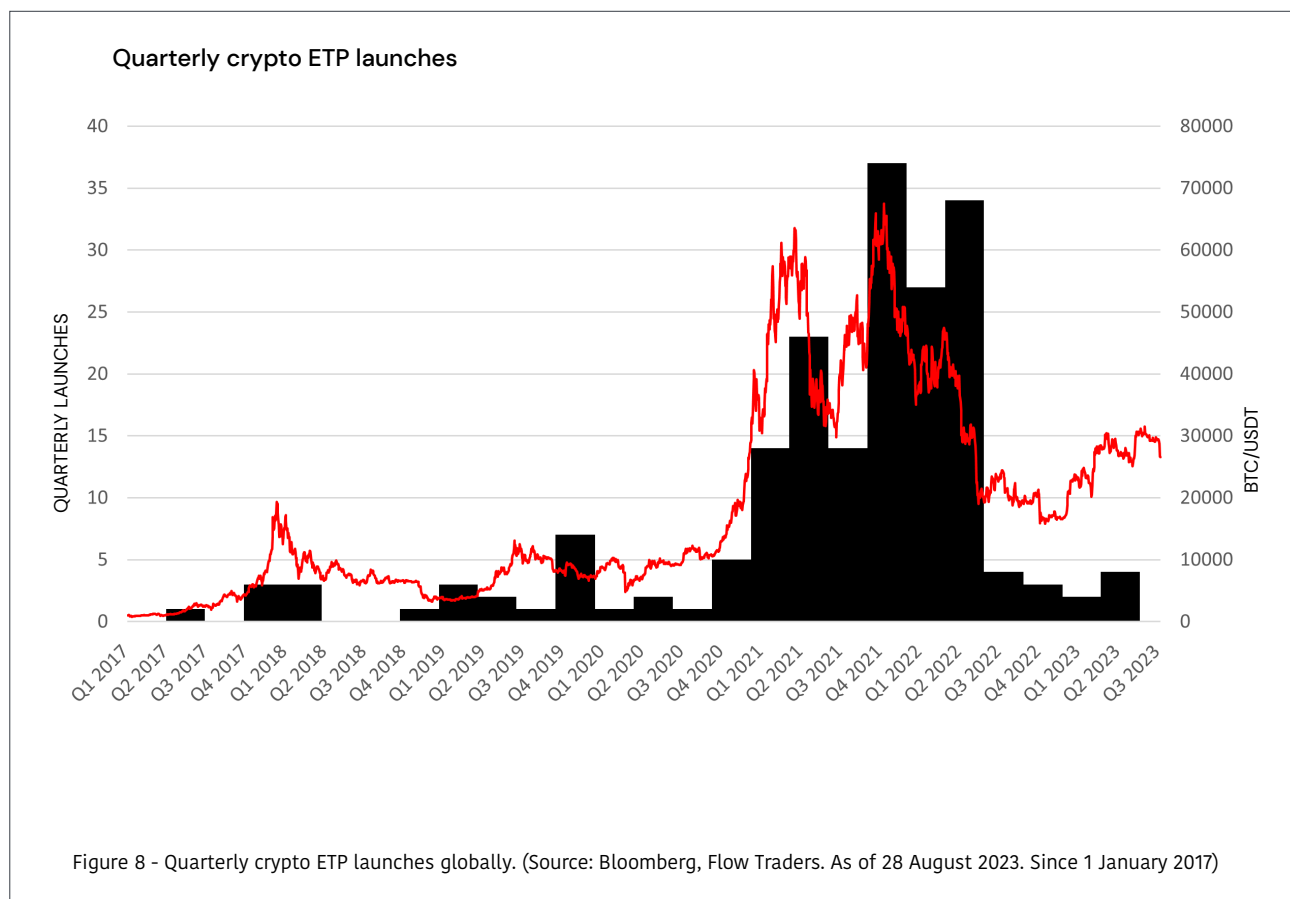
[4] CNBC, 2017. CNBC. [Online]
Available at: https://www.cnbc.com/2017/12/17/worlds-largest-futures-exchange-set-to-launch-Bitcoin-futures-sunday-night.html [Accessed 23 August 2023]

Not long after the launch of Bitcoin futures on CME, they also began supporting Ethereum futures. More recently, Eurex also listed futures for Bitcoin and Ethereum. These products tend to be much more institutional-focused compared to futures on crypto-native exchanges, given the accessibility of these exchanges.

Case in point, we observed a divergence in the premium levels these futures are trading on regulated exchanges compared to unregulated exchanges, indicating that these regulated exchanges are seen as a haven during periods of heightened volatility and uncertainty.

Going forward, we expect crypto product development to continue to grow and gravitate towards institutional-focused offerings, and this overall trend continues with the recent developments around a Bitcoin spot ETF products[5] as well the prospective launch of Ethereum ETFs based on Ether futures[6].

Segregation of Custody and Clearing

Considering events that rocked the crypto ecosystem in 2022, it became evident that the existing infrastructure and practices of the time were no longer sustainable.

In 2022, as the market entered a prolonged bear phase, the crypto industry faced many challenges, and several major platforms suffered from hacks, collapses, and bankruptcies. Some of the most notable included:

- The Ronin Bridge hack that resulted in over $600 million worth of Ether and USDC being stolen from the popular play-to-earn NFT game Axie Infinity[7].

- The TerraUSD/LUNA collapse that caused massive liquidations of over $2 billion worth of UST and LUNA, triggering a domino effect on other DeFi protocols[8].

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[5] Forbes, 2023. Forbes. [Online]
Available at: https://www.forbes.com/advisor/investing/cryptocurrency/spot-bitcoin-etf/
[Accessed 23 August 2023].

[6] Bloomberg, 2023. Bloomberg. [Online]
Available at: https://www.bloomberg.com/news/articles/2023-08-17/sec-said-to-be-poised-to-allow-us-debut-of-ether-futures-etfs-eth
[Accessed 23 August 2023].

[7] Cointelegraph, 2022. Cointelegraph. [Online]
Available at: https://cointelegraph.com/news/the-aftermath-of-axie-infinity-s-650m-ronin-bridge-hack
[Accessed 23 August 2023].

[8] CoinDesk, 2022. CoinDesk. [Online]
Available at: https://www.coindesk.com/learn/the-fall-of-terra-a-timeline-of-the-meteoric-rise-and-crash-of-ust-and-luna/
[Accessed 23 August 2023].

- The Three Arrows Capital collapse that exposed the vulnerability of centralized lending platforms and led to the loss of $1.2 billion worth of crypto assets[9].

- The Voyager Digital fall that revealed the fraudulent practices of the crypto broker and resulted in a class-action lawsuit and a regulatory investigation[10].

- The Celsius crash and liquidity crisis that forced the lending platform to suspend client withdrawals and reduce interest rates for its users[1].

- The FTX collapse that sent a shockwave through the crypto world and triggered a market-wide sell-off in November, after the exchange filed for bankruptcy due to insolvency and fraud allegations[12].

- The BlockFi bankruptcy that followed shortly after FTX's demise, as the lending platform was unable to meet its obligations and faced legal actions from creditors and regulators[13].

Historically, the crypto community and ecosystem have often been characterized as "speed running" through centuries of financial history. Nevertheless, notable indications of progress have emerged, offering substantial reinforcement to the ecosystem's growth and development.

One recent and welcome development has been a trend towards segregating roles and functions. This trend has been particularly prominent in the areas of custody and clearing, with the aim of separating these critical functions from trading and execution.

On this front, several companies are developing solutions to address these challenges. For non-custodial trading, there are Copper, Fireblocks, BitGo and Ledger. ClearToken specializes in clearing for digital asset exchanges, while Hidden Road Partners and FalconX offer prime brokerage and credit.

We see the emergence and increasing adoption of these platforms and services as critical for re-establishing trust in the space, allowing crypto to reach its full potential and onboard the next billion users, both retail and institutional. Furthermore, we expect novel and unexpected designs and solutions resulting from adaptations of TradFi best practices to the technological paradigm of crypto.

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[9] CoinDesk, 2023. CoinDesk. [Online]
Available at: https://www.coindesk.com/business/2023/07/07/three-arrows-capital-liquidator-may-try-to-claw-back-about-12b-from-dcg-blockfi
[Accessed 23 August 2023].

[10] BNN Bloomberg, 2022. BNN Bloomberg. [Online]
Available at: https://www.bnnbloomberg.ca/crypto-broker-voyager-faces-proposed-class-action-suit-over-trading-fees-1.1701268
[Accessed 23 August 2023].

[11] Financial Times, 2022. Financial Times. [Online]
Available at: https://www.ft.com/content/4fa06516-119b-4722-946b-944e38b02f45
[Accessed 23 August 2023].

[12] The Block, 2022. The Block. [Online]
Available at: https://www.theblock.co/post/186132/ftx-collapse-timeline-six-days-that-rocked-the-crypto-industry
[Accessed 23 August 2023].

[13] The Block, 2022. The Block. [Online]
Available at: https://www.theblock.co/post/188915/crypto-firm-blockfi-files-for-bankruptcy
[Accessed 23 August 2023].

GICS

The Digital Asset space has yet to converge on a universal classification structure. The absence of this instills barriers for investors and allocators to understand differences in market segments outside of blue-chip majors Bitcoin and Ethereum. A proper classification framework is imperative in expanding the asset class as it will help to proliferate the development of new products, as well as open up opportunities for new allocation strategies. Sectorization of Digital Assets will also enhance acceptance and further credibility to the asset class. This implementation could further drive legitimacy and recognition leading to the attraction of institutional capital flow.

To understand what a universal digital asset classification structure entails, we can look to the Global Industry Classification Standard (GICS) which was developed by MSCI and Standard & Poor's in 1999. GICS aims to: 1) Measure the impact of global, regional and local trends. 2) Provide insight into sector exposures where portfolio managers are able to benchmark against indexes or to peers. 3) Assess portfolio performance from an attribution level across sector and industry. 4) Drive sector-based investments[14] i.e., in mutual funds the rise of "Consumer Growth Funds" which encompass a focus in sectors Consumer Discretionary and Consumer Staples. The creation of the framework was meant to meet the global finance sector's requirement for a universal, comprehensive, and industry standard structure in definition of terminologies. The

GICS framework is a four-tiered hierarchical framework based on: Sectors, Industry Groups, Industries and Sub-Industries.

The 11 sectors[15]:

- Consumer Discretionary
- Consumer Staples
- Energy
- Materials
- Industrials
- Healthcare
- Financials
- Information Technology
- Real estate
- Communication Services
- Utilities

The GICS framework has solidified its importance in financial markets as it provides a foundation for investors in making allocation decisions, risk assessments and performance evaluation models. The structure has made significant impacts in revolutionizing equity investing practices.

The race to be the next GICS equivalent in the Digital Asset space is on. There are three specific frameworks that have appeared, Datonomy, a joint collaboration between Goldman Sachs, MSCI & CoinMetrics, DACS (Digital Asset Classification Standards) by CoinDesk and GCCS (Global Crypto Classification Standard) by 21Shares & CoinGecko.

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[14] MSCI. (n.d.). GICS - Global Industry Classification Standard. MSCI. Available at: https://www.msci.com/our-solutions/indexes/gics (Accessed: 21 August 2023).
[15] MSCI. (n.d.). GICS - Global Industry Classification Standard. MSCI. Available at: https://www.msci.com/our-solutions/indexes/gics (Accessed: 21 August 2023).

Figure 9 - Datanomy classification. (Source: https://coinmetrics.io/datonomy. Accessed on 21 August 2023.)

Datonomy defines its constituents based on a three-level hierarchy system, categorizing it by Class, Sector and Sub-Sector. Class attempts to define a protocol's fundamental purpose. Sector looks at specializations of that class and Sub-Sector differentiates product, service, or function within that sector. The framework consists of 4 Classes, 14 Sectors, and 41 Sub-Sectors[16]. The four classes are defined by Digital Currencies, Blockchain Infrastructure, Digital Asset Applications, and On-Chain Derivatives.

CoinDesk's own GICS framework dubbed the DACS (Figure 11) consists of three tiers branching off to six sectors, 21 industry groups, and 36 industries. I.e. MATIC, Polygon falls under the Sector of Smart Contract Platform, Industry Group of Layer 2 and Industry of Sidechains.

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[16] MSCI Inc. (2022) Datonomy Methodology. Available at: https://www.msci.com/documents/1296102/33887102/Datonomy+Methodology.pdf (Accessed: 21 August 2023).

Name	Sector	Industry Group	Industry
Polygon	Smart Contract Platform	Layer 2	Sidechains

Figure 10 - Digital Asset Classifications Standards. (Source: https://coinmetrics.io/datonomy. Accessed on 21 August 2023).

The methodology behind the DACS is determined by factors such as the project's website, white paper, on–chain activity, third party audits, social media channels, peer reviews, as well as other publicly available information[17].

The framework attempts to seek the token's dominant application as well as identify other similar projects to the token that would fall under the same classification.

Figure 11 – DACS (Source: CoinDesk. (2023) Digital Asset Classification Standard – CoinDesk Indexes. CoinDesk. Available at: https://www.coindesk.com/dacs/. Accessed: 21 August 2023).
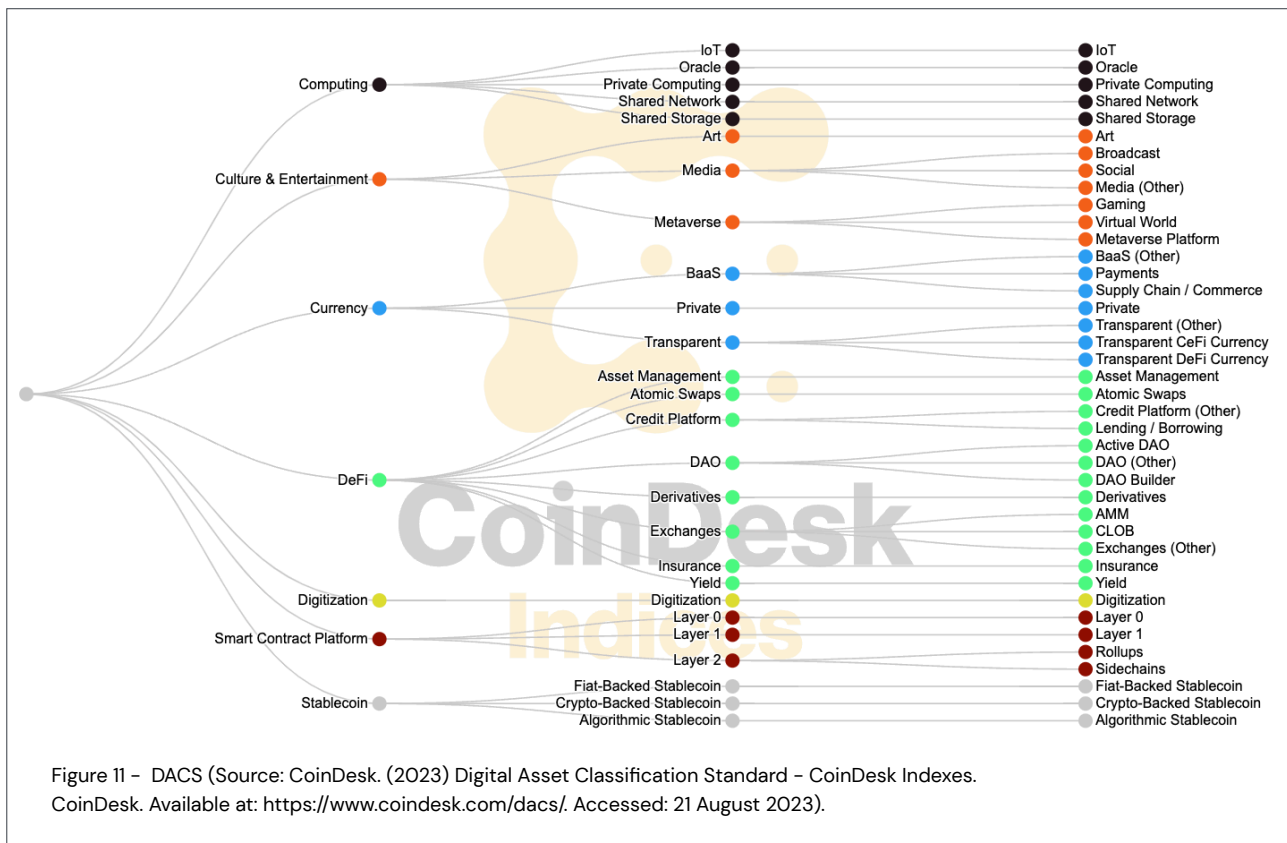
21Shares and CoinGecko released their own GCCS earlier this year, attempting to create an alternative industry classification. Similarly, to the DACS, the GCCS also consists of three levels.

Level 1: The Crypto Stack, level 2: Market Mapping by (a) Sectors, and (b) Industries and level 3: Taxonomy of Crypto Assets.

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[17] CoinDesk. (2022) Digital Asset Classification Standard (DACS) Methodology. Available at: https://downloads.coindesk.com/cd3/CDI/ Digital+Asset+Classification+Standard+Methodology.pdf (Accessed: 21 August 2023).

Levels	Classification	Terminology
Protocol Level	**Level 1:** **The Crypto Stack**	Cryptocurrencies, App-Specific Blockchains, cApps, Interoperability, Oracles, dApps, Scaling, Smart Contract Platforms
	Level 2: **Market Mapping** **(a) by Sector** **(b) by Industries**	App Development, CeFi, Metaverse, DeFi, Entertainment / Leisure, Identity, Storage, Infrastructure, IoT, Interactive Media
Token Level	**Level 3:** **Taxonomy of Cryptoassets**	Cryptocurrency, Native Currency, Staked Currency, Derivative Token, Governance Token, Utility Token, Fiat Collaterized Stablecoins, Anchored Stablecoins, Reflexive Stablecoins, Royalty Generating NFTs, Collectibles NFTs, Consumable or Redeemables NFTs

21shares | CoinGecko

Figure 12 – GCCS (Source: CoinGecko (2023) The Global Crypto Classification Standard by 21shares & CoinGecko, CoinGecko. Available at: https://www.coingecko.com/research/publications/global-crypto-classification-standard#:~:text=Developed%20 by%2021Shares%20and%20CoinGecko&text=The%20GCCS%20provides%20a%20clear,of%20the%20larger%20crypto%20 stack. Accessed: 22 August 2023).

These frameworks attempt to provide the industry with a better standardized approach for how we categorize tokens/projects. It is difficult to predict which of the classification standards will become the industry leader with their differing methodologies. There are clear distinctions, however, between how GICS can achieve a broad-based quantifiable classification in sub-industries, compared to the Digital Assets space.

Under GICS the classification of a company based on revenue and earnings where over 60% of a business's revenue is derived from will determine its sub-industry category. If this was applied to a token/project it would prove difficult as not all constituents are able to disclose their balance sheets. For example: If Amazon. com Inc[18] Financial statements revenue report being composed of online stores 43%, physical stores 4% and third-party seller services 23% that is a total of 67% of revenue derived from broadline retail despite 16% of revenue coming from Amazon Web Services, meaning it would fall under the sector of Consumer Discretionary and not Information Technology. The prevention of double accounting under this instance is important as it is the same case as Digital Assets. When assessing Ripple through Datonomy it might be classed under Blockchain Infrastructure, but as it is also expanding into CBDC's it might also fall under On-chain Derivatives as a Stablecoin sector. The ideal methodology might not exist yet, and it is clear that a GICS equivalent framework is still in its nascent stages. While there is no dominant standard from our perspective in terms of measuring adoption between Datonomy, DACS, and GCCS, a universally agreed classification standard will be an important step forward.

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[18] MSCI. (n.d.). GICS - Global Industry Classification Standard. MSCI. Available at: https://www.msci.com/our-solutions/indexes/gics (Accessed: 21 August 2023).

It is probably just as important to understand why there is a race to become the industry standard framework in Digital Assets. A globalized classification standard such as GICS is important for indexes as it allows for the creation of products such as exchange-traded funds (ETFs) and other index-linked innovations. Indexes will increasingly play an important role in driving capital allocation into the Digital Asset space.

Indexes

It is unsurprising that after partnering with Goldman Sachs and CoinMetrics in creating Datonomy, MSCI has launched its own set of indexes that use Datonomy's classification system. The three indexes are the MSCI Global Digital Assets Index, the MSCI Global Digital Assets Smart Contract Index and the MSCI Global Digital Assets ex Proof-of-work Index.

The product of these indexes has only come about after first developing a classification standard like Datonomy, highlighting the importance these frameworks can have. Product innovators can license the indexes to benchmark against their own portfolio or license the classification system for attribution reporting.

The iShares Core MSCI Asia ex Japan ETF issued by BlackRock, for example, references the MSCI AC Asia ex Japan Index as a benchmark. Indexes are generally created to serve as a benchmark to an ETF or mutual fund.

To provide better context of the important role indexes will play in the crypto sector, we can take China's inclusion in the MSCI Emerging Markets Index back in 2019 as an example. In June 2017, China represented ~28% of the MSCI Emerging Markets Index[19]. As of November 2019, 472 large and mid-cap China A share companies were included in the index bringing China's weight to ~33%[20]. This led to an expansion in sector scope with an increase of over 60 standard constituent stocks[21] in each of the 11 GICS sectors.

More importantly the increase in constituents led to significant liquidity changes. Foreign investors were now able to increase their exposure in the A-shares market helping to drive foreign institutional investors' participation in China's domestic equity market.
The combination of accessibility and liquidity changes helped propel China's equity market to offshore allocators. The involvement of international investors in the China A shares market witnessed significant growth since 2017.

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[19] Wei, Z. (30 October 2020) China A shares: What have we learned?, MSCI. Available at: https://www.msci.com/www/blog-posts/china-a-shares-what-have-we/02164045217 (Accessed: 22 August 2023).

[20] Wei, Z. (30 October 2020) China A shares: What have we learned?, MSCI. Available at: https://www.msci.com/www/blog-posts/china-a-shares-what-have-we/02164045217 (Accessed: 22 August 2023).

[21] Wei, Z. (30 October 2020) China A shares: What have we learned?, MSCI. Available at: https://www.msci.com/www/blog-posts/china-a-shares-what-have-we/02164045217 (Accessed: 22 August 2023).

Foreign holdings of China A shares escalated from USD 38 billion, representing 0.67% of the total market, in December 2016 to over USD 195 billion, accounting for 3.03% of the market, by September 2019[22].

In the case of crypto, we anticipate that once the industry matures, and should there be an increased emphasis on crypto ETFs, token liquidity will be affected by the inclusion of these assets into these indexes.

There are already quite a few other index providers such as the Bloomberg Galaxy Crypto Index (BGCI), Nasdaq Crypto Index, and the S&P Cryptocurrency Broad Digital Market Index.

The Bloomberg Galaxy Crypto Index is a weighted index that tracks the performance of the largest cryptocurrencies traded compared to the Bloomberg Galaxy Defi Index which just focuses on decentralized finance protocols.

The Nasdaq Crypto Index (NCI) assesses the performance of a range of cryptocurrencies which currently consists of nine cryptocurrencies that serve as its constituents.

The current indices are a step in the right direction in helping to build the foundations of a market structure that allocators would consider when making investment decisions.

The S&P Cryptocurrency Broad Digital Market Index attempts to track a broad range of the investible token universe. It filters the assets based on minimum liquidity and market cap criteria. The current indices are a step in the right direction in helping to build the foundations of a market structure that allocators would consider when making investment decisions.

Component	Weight %
Bitcoin (BTC)	65.80
Ethereum (ETH)	31.06
Litecoin (LTC)	1.04
Bitcoin Cash (BCH)	0.60
Polkdot (DOT)	.39
Chainlink (LINK)	0.37
Stellar Lumens (XLM)	0.28
Uniswap (UNI)	0.27
Ethereum Classic (ETC)	0.18

Figure 13 – NCI (Source: Nasdaq crypto index (NCI) (2021) Nasdaq. Available at: https://www.nasdaq.com/solutions/crypto-index Accessed: 22 August 2023).

[22]Wei, Z. (30 October 2020) China A shares: What have we learned?, MSCI. Available at: https://www.msci.com/www/blog-posts/china-a-shares-what-have-we/02164045217 (Accessed: 22 August 2023).

Portfolio Construction

We have already established the relationship between classification standards and indexes, now we will explore how benchmarks feed into crypto funds and portfolio construction.

Traditionally in mutual funds, a portfolio manager's performance returns are benchmarked against an index to detail to investors the alpha, sector allocation, portfolio concentration, tracking error etc.

Various long only crypto funds are still benchmarking their portfolio to Bitcoin's NAV which might not be the ideal comparison, i.e. if it was a thematic, DeFi-focused long only fund. In that case, depending on the fund strategy and methodology of the index, the Bloomberg Galaxy Defi Index for example might be a more appropriate benchmark.

As mentioned in the previous section, traction for indexes in the crypto space still seems to be in its infancy. It might be interesting however, to analyse the outcomes of a diversified portfolio outside of the traditional 60/40 allocation.

A recent paper by Blackrock exploring the utility function of adding Bitcoin allocation to an equity-bond portfolio revealed that the optimal BTC allocation was 84.9%[23]. While allocation across asset classes depends on a multitude of considerations such as an investor's risk tolerance, investment horizon, diversification, goals etc., to explore what portfolio returns look like into BTC we will attempt to simulate four portfolios based on:

1. Portfolio A – a traditional 60/40 allocation of 60% equities and 40% in bonds with zero BTC exposure

2. Portfolio B – a 1% allocation into BTC while maintaining a 60/40 ratio to equities and bonds exposure

3. Portfolio C – a 3% allocation into BTC while maintaining a 60/40 ratio to equities and bonds exposure

4. Portfolio D – a 5% allocation into BTC while maintaining a 60/40 ratio to equities and bonds exposure

In all four portfolios we used the Vanguard Total Stock Market ETF (VTI) for the equity component and the Vanguard Total Bond Market ETF (BND) for the bond component. The VTI aims to cover US large-cap, mid-cap, and small-cap equity across both growth and value stocks. The BND attempts to represent the taxable investment-grade U.S. dollar-denominated bond market. This does not include inflation-protected and tax-exempt bonds. We chose a 7-year investment horizon as an investment horizon since inception for BTC would skew returns exponentially. To provide context, the % return for BTC from 2010 to 2023 is approximately 32,296,238%[24]. The following portfolios do not account for rebalancing and have the same inception date of 19 August 2016.

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[23] Ang, A., Morris, T. and Savi, R. (2022) Asset allocation with crypto: Application of preferences for positive skewness, SSRN. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4042239 (Accessed: 22 August 2023).

[24] Source: Bloomberg data, as of 23 August 2023. Since inception 19 July 2010.

Portfolio A: 60% VTI and 40% BND with 0% BTC allocation

We observe in Portfolio A an investment of $100 in 60% equities and 40% bond allocation provides a return of $150. The portfolio has generated a 50% return.

Figure 14 – Portfolio A (Source: Bloomberg, Bullish data, as of 22 August 2023. Since inception 19 July 2010).

Portfolio B: 1% BTC allocation, 59.4% VTI and 39.6% BND

We observe in Portfolio B an investment of $100 in 1% BTC and maintaining a 60/40 ratio in equities and bonds, provides a return of $191. The portfolio has generated a 91.1% return.

Figure 15 – Portfolio B (Source: Bloomberg, Bullish data, as of 22 August 2023. Since inception 19 July 2010).

Portfolio C: 3% BTC allocation, 58.2% VTI and 38.8% BND

We observe in Portfolio C an investment of $100 in 3% BTC and maintaining a 60/40 ratio in equities and bonds, provides a return of $280. The portfolio has generated a 180.3% return.

Portfolio C with 3% BTC Allocation

Figure 16 – Portfolio C (Source: Bloomberg, Bullish data, as of 22 August 2023. Since inception 19 July 2010).

Portfolio D: 5% BTC allocation, 57% VTI and 38% BND

We observe in Portfolio D an investment of $100 in 5% BTC and maintaining a 60/40 ratio in equities and bonds, provides a return of $367. The portfolio has generated a 267.2% return. .

Portfolio D with 5% BTC allocation
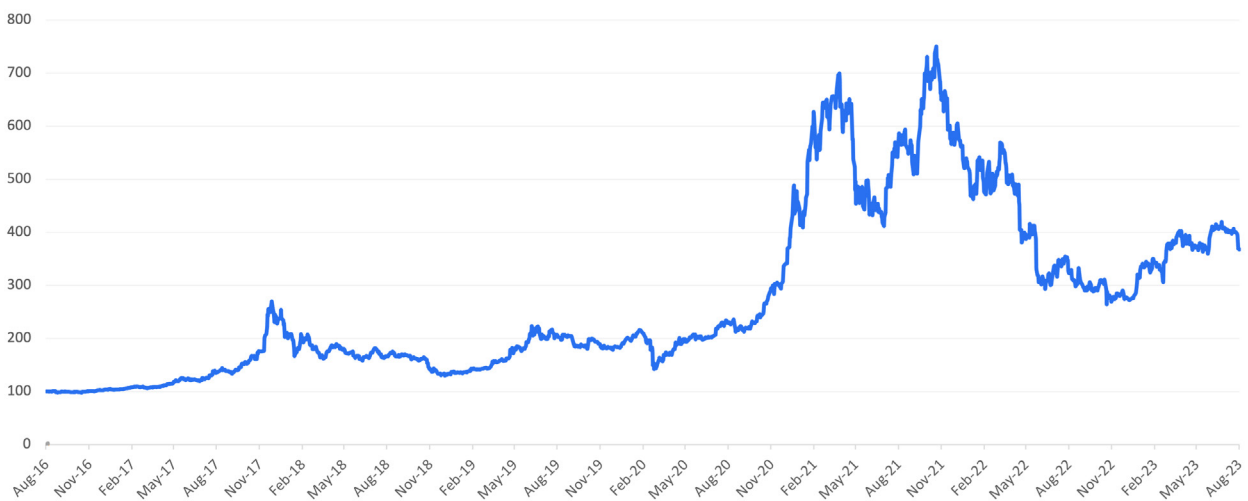
Figure 17 – Portfolio D (Source: Bloomberg, Bullish data, as of 22 August 2023. Since inception 19 July 2010).

When we analyze the portfolio returns against its exposure to BTC, we find during the same investment horizon of a 7-year period, increased exposure to BTC can skew the portfolio outcome significantly with varied returns.

	Exposure to BTC	Returns
Portfolio A	0%	50%
Portfolio	1%	91.1%
Portfolio C	3%	180.30%
Portfolio D	5%	267.20%

Indexes and classification frameworks were explored earlier in this report. These segments help us understand how benchmarks are used in the process of portfolio construction. While we have not compared the above portfolio simulations to a standard benchmark per se, it is in our opinion that they will become an increasingly integral part of the investment process when allocators factor in asset allocation with/without BTC exposure while considering the skews to returns.

Figure 18 – Portfolio Table (Source: Bloomberg, Bullish data, as of 22 August 2023. Since inception 19 July 2010).

Allocators

Fund ratings are particularly important for platforms, independent financial advisors (IFA) and financial advisor dealer groups as most licensees are permitted to advise and deal within a set list of products/platforms that meet certain criteria; this list is known as an Approved Product List (APL). Gatekeepers of these APLs may look to rating agencies like Morningstar, Zenith, Mercer, CRISIL etc. as one of many of their criteria. These mutual fund rating agencies generally apply a qualitative or quantitative grading system to these funds. Morningstar Analyst Ratings for example grade a fund from 'Gold' being the best to 'Negative' being the worst.

Outside of ratings various factors can also affect a fund's ability to enter an APL, from the years of inception (generally speaking typically a minimum of 3 years) to fund performance right through to AUM size etc. For crypto funds, these criteria may be still either too early (not enough years of performance history) or might be lacking on the

AUM side (generally speaking above $100mn). One might ask why crypto funds should care about fund ratings and APLs. In 2022, SEC-registered investment advisors in aggregate held a total AUM (assets under management) of $114 trillion[25], this signals the potential headroom for growth in the Digital Asset space and that it could be quite significant if allocation into the asset class ready to be deployed. In addition, allocators like pension funds, endowment funds, foundations and sovereign wealth investors may be limited by their investment mandate where their investable universe may be restricted away from digital assets until certain tick boxes are met. If the industry is able to set itself up to mirror that of how allocation into traditional assets is being made at present, then it may stand to benefit from the potential capital inflows these allocators hold. Preparing for a market structure that is built for institutional investors is imperative in the next leg to adoption.

[25] Published by Statista Research Department (2023) Total AUM of investment advisors 2022, Statista. Available at: https://www.statista.com/statistics/1251309/total-aum-investment-advisors/ (Accessed: 22 August 2023).

The Bullish exchange: Solving for the next phase of institutional entrants

When institutions trade there are a set range of parameters they may look for, this includes but is not limited to factors such as deep and unique sources of liquidity, tight spreads, independent price discovery, and competitive fee structures. Keeping these factors in mind, the Bullish exchange was built to combine a central limit order book and automated market maker (AMM) in order to provide deep and predictable liquidity throughout varying market scenarios. We knew that spreads played an important role in institutional trading, as every basis point counts, thus geared the order book to near-zero spreads and low slippage costs. Traders understand that independent price discovery is vital in determining the equilibrium price of a token therefore facilitating the greatest possible liquidity for that asset. Bullish's proprietary AMM operates independently from external price feeds or oracles to generates thousands of firm bids and offers using liquidity exclusively available on our platform. These bids and offers do not move unless traded against, creating predictable depth and making Bullish more reliable and efficient.

As the industry evolves and the competition for liquidity intensifies, we remind ourselves to constantly innovate in anticipation of increased institutional adoption. Back in November 2021 when Bullish launched, our AMM markets had price curves of (0, ∞), meaning that liquidity for a given token pair was distributed across an infinite range of bids and offers. This meant that most of the liquidity was outside of a price range in which a token was expected to trade. We went back to the drawing board and in May 2022 introduced Range Bound Liquidity (RBL), the first major update to our AMM as a part of our long-term goal of maximizing capital efficiency. RBL is a form of "concentrated liquidity" where upper and lower price bounds are set for price curves. This means all the liquidity behind the AMM is deployed within a price range where trading is expected to occur. This has the effect of creating greater order book depth with the same amount of capital. The most revolutionary upgrade to our AMM technology came about in October 2022 when we released Longhorn, an update that took customizable liquidity to the next level. With the introduction of AMM instructions, eligible customers can directly make markets within user-defined trading parameters such as markets, price range and spreads, and generate trading income while doing so. This advancement represents the latest phase of Bullish's continued pursuit in maximizing capital efficiency and flexibility, as we continue to develop the most efficient and trusted digital assets execution venue built for institutions.

Flow Trader's journey into crypto

From a trading standpoint, cryptocurrency has always piqued our interest as a unique asset class.

Recognizing the retail adoption and uptick in volumes in early 2017, we delved into crypto and benefited from the increased volatility. This expansion was punctuated by our operations during the Bitcoin fork where market participants dealt with heightened complexity and limited market understanding. Yet, we were able to leverage our expertise from Tradfi to navigate this event-driven uncertainty.

Since then, the dynamism of the crypto market has not abated and its rapid evolution accelerated our adoption of new technologies, notably cloud computing. As a tech-centric firm, this transition was both enlightening and rewarding.

On the product and operational side, innovations from the crypto ecosystem, whether they be perpetual swaps or auto-liquidation mechanisms, have enabled us to broaden our product expertise. 24/7 operation of the crypto markets also mandated a more robust and efficient global operating model.

Given our heritage as a global multi-asset liquidity provider, our journey in the crypto ecosystem has been informed and shaped by our TradFi experience. This legacy aided our understanding of market anomalies like forks, merges, and the overarching volatility. We have been able to draw parallels between drastic crypto market shifts and past black swan

events, such as the 2015 Swiss Franc de-peg. Such historical events and subsequent trading experience have been instrumental in refining our risk management approach.

The biggest challenge we faced, as a publicly listed and regulated company, was to be able to enter this space so early. As a regulation-first organization, transparency and engagement with our regulator has been a priority, including collaborative efforts around information-sharing and education on the emergency crypto ecosystem. Given the lack of regulatory framework at the time, our approach was to apply the same principles and best practices gained from our experience in TradFi.

Looking ahead, our dual experience in TradFi and crypto liquidity provisioning uniquely positions us in this evolving industry. We are deeply attuned to innovations in both centralized and decentralized exchange ecosystems. As institutional integration gains momentum, we aim to harness our vast institutional network to catalyze adoption and innovation.

Our understanding of the pain points within TradFi - for instance around settlement times or cross border payments - instil in us a bias towards a problem-solving approach, rather than an opportunity-driven mindset where adoption may be lacking. Through this approach, and our combined network and expertise, we believe we can accelerate the convergence of TradFi and crypto and bring the best from both domains to create a more accessible, secure, and efficient global financial system.

Conclusion

In conclusion, this paper has delved into various themes around the convergence between cryptocurrencies and TradFi, highlighting the increasing proximity of these two domains. With institutional investors increasingly eyeing the crypto space, the necessity for a structured and well-defined market becomes ever more evident.

The correlation analysis between Bitcoin and traditional assets provided some insights into the behaviour and dynamics of the market. The discussions surrounding the segregation of roles and tokenization emphasized the intricacies and dynamism of this emerging space, offering institutional investors a glimpse into the future of finance.

By examining the current state and evolution of the crypto market, we have demonstrated how elements from TradFi, such as sector classification schemas and indexes, are being adapted and integrated into the crypto landscape. The roles played by key players like Bullish and Flow Traders have also been explored, shedding light on their influence and contributions to the market.

As the cryptocurrency market continues to evolve and mature, the bridge between it and TradFi is growing stronger. Institutional investors must grasp the significance of this convergence and understand its implications to navigate and make informed investment decisions within the crypto space.

Conversely, crypto market participants, including service and infrastructure providers, would be well-served to better understand the current TradFi landscape and user expectations to better adapt and cater to institutional investors.

The unfolding of this exciting convergence promises to reshape the global financial landscape, presenting both new opportunities and challenges for institutions and investors alike.

In summary, the increased integration between crypto and TradFi represents a transformative force. By understanding the evolving market structure, embracing sector classification frameworks, adapting to new investment products and strategies, and recognizing the integration of roles and tokenization, institutional investors can position themselves to thrive in this evolving landscape. As the boundaries between TradFi and crypto blur, the future of finance holds immense potential for those who see it clearly and embrace it.

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F L O W ■ T R A D E R S

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